The JOURNAL of GEOGRAPHY

A Monthly Magazine Devoted to the Interests of Teachers of Geography in Elementary, Secondary, and Normal Schools.

RAY HUGHES WHITBECK, *Editor* LAWRENCE MARTIN, *Associate Editor*
Of the Department of Geology and Geography at the University of Wisconsin

VOLUME XIV OCTOBER, 1915 NUMBER 2

PERIODICAL RECEIVED OCT 9 1915 UNIV. OF MICH. LIBRARY

CONTENTS

		Page
The Growth of Great Cities	*FREDERICK HOMBURG*	33
Overlooked Bohemia	*EUGENE VAN CLEEF*	39
Harbors of South America	*HENRY F. JAMES*	43
Glaciers and Glaciation of South America	*WALTER H. SCHOEWE*	49
Outline for the Study of Frost and Protection against Frost	*WILLIAM G. REED*	54
Chile	*EMILY A. BUDD*	56
The Geography Teacher's Resolutions		57
The Discovery of the Painted Stone, an Early Observation of the Driftless Area	*LAWRENCE MARTIN*	58
Current Geographical Notes:		
Geography with the Allies		60
Map of the U. S. for One Cent		60
The Ineffective Blockade of the British Isles		60
A Traveler's Guide to the Pacific Coast		61
Panama Ships and Cargoes		62
When the Gulf of Mexico Reached Cairo		63
News Notes		64
Review Questions on The Ocean		

Authors Are Personally Responsible for Opinions and Statements Expressed in The Journal

$1.00 a Year THE JOURNAL OF GEOGRAPHY 15c a Copy

V. C. FINCH, Business Manager

University of Wisconsin, Madison, Wis.

Entered at the Post Office, Madison, Wis., as Second Class Mail Matter Sept. 9, 1910

The Journal of Geography

Published Monthly Except July and August

Successor to the Journal of School Geography, Vol. V, and the Bulletin of the American Bureau of Geography, Vol. II.

Editor
RAY HUGHES WHITBECK.

Associate Editor
LAWRENCE MARTIN.

Of the Department of Geology and Geography, University of Wisconsin.

Contributing Editors, 1915-16

ISAIAH BOWMAN, Director of the American Geographical Society, New York.
JAMES F. CHAMBERLAIN, Professor of Geography, State Normal School, Los Angeles, Cal.
W. N. CLIFFORD, Southern High School, Philadelphia, Pa.
GEORGE E. CONDRA, Professor of Geography, University of Nebraska.
RICHARD E. DODGE, Professor of Geography, Teachers College, New York.
WILLIAM M. DAVIS, Professor of Geology, Harvard University.
PHILIP EMERSON, Principal Cobbet Grammar School, Lynn, Mass.
N. M. FENNEMAN, Professor of Geology, University of Cincinnati.
WILLIAM M. GREGORY, Professor of Geography, Normal School, Cleveland, O.
J. PAUL GOODE, Associate Professor of Geography, University of Chicago.
MARK JEFFERSON, Professor of Geography, State Normal College, Ypsilanti, Mich.
EDWARD VAN DYKE ROBINSON, Professor of Economics, Columbia University, New York.
WILLIAM J. SUTHERLAND, President State Normal School, Platteville, Wis.
ROBERT DeC. WARD, Professor of Climatology, Harvard University.

Rules of Publication

PRICE—The subscription price is one dollar a year, payable in advance. Fifteen cents a copy.

POSTAGE IS PREPAID by the publisher for all subscriptions in the United States, Hawaiian slands, Philippine Islands, Guam, Porto Rico, Tutuila and Samoa. Add 10 cents postage for Mexico and Canada. For all other countries in the Universal Postal Union add forty cents for postage.

CHANGE OF ADDRESS—When a change of address is ordered, both the new and the old addresses must be given. The notice should be sent ten days before the change is to take effect. Subscribers who fail to give notice of change are responsible for payment for all copies sent until notice is received. The post-offices do not forward second-class mail matter. Subscribers who do not observe this rule will not be sent duplicate copies.

DISCONTINUANCES—If a subscriber wishes his magazine discontinued at the expiration of his subscription, notice to that effect should be sent direct to the publisher, never ot an agent. Otherwise it is assumed that a continuation is desired. Do not ask the publisher to discontinue your subscription without paying arrearages.

HOW TO REMIT—Remittance should be sent by Check, Draft, Express Order, or Money Order, payable to order of The Journal of Geography. It is, as a rule, safe to send a dollar bill without registering, but sender must assume the risk. Larger amounts should not be sent in cash.

THE JOURNAL OF GEOGRAPHY

V. C. FINCH, Business Manager

University of Wisconsin, Madison, Wis.

The JOURNAL of GEOGRAPHY

Volume XIV OCTOBER 1915 Number 2

GROWTH OF GREAT CITIES

By Frederick Homburg
Woodward High School, Cincinnati

The Origin of Cities

WHO, according to the Bible, was the founder of cities? It was Cain, the tiller of the soil, not Abel the herdsman. Why should the herder, in the midst of the roving life of a nomad, suddenly get the notion of settling down in community life, which would involve curtailment of his accustomed freedom? In ascribing to the agriculturist the founding of the first city, Semitic tradition is undoubtedly correct, however strange and paradoxical that seems; paradoxical, because the contrast between city and country is growing more and more pronounced; strange, because we are not apt to think of Jews as farmers. We must remember that cities at the beginnings of civilization were not cities as we know them; they were not centers of industry and commerce, but places of refuge of a rural population. Those ancient towns were enclosures with walls, preferably on heights or near waters, so as to give the insiders every advantage in defense. In times of danger the country people on a considerable area would drive their herds and carry their chattels into these enclosures, and as soon as the danger was passed, they would return to their fields. After a while such a fortification became the gathering place not only when enemies were near, but also for celebrations, festivals, and religious concourses; and thus in time it became the permanent abode of a number of people. "Safety first" is a modern slogan, but the principle is an old, and, in the early days, a most necessary one.

The Roman, or perhaps better called the Etruscan, rite of founding a city substantiates Hebrew tradition. According to this sacred custom, a yoke of oxen was hitched to a plow and a furrow was drawn to mark the place for the protecting wall. Where a gate was to be built, the plow was lifted and carried—*portare*, to carry—hence the city gates were the portals. Who but a cultivator of the soil would have thought of drawing a line with a plow, and who but those that needed protection above everything else would have set limits and erected a wall about an empty expanse? Suppose merchants had founded the early cities; would they have fixed the bounding line first? Would they not rather have thought first of a market place as a commercial center, and built outward, with streets for travel and transportation and structures for dwelling and storing? Now, of course, the unyielding and confining girdles have usually been removed, and what was at first incidental has become of prime importance, viz., buildings, squares, and streets. At first, however, pro-

tection was the motive, and here again we have confirmed the contention that the first city builders were farmers. In the plains of Mesopotamia and in the Nile valley, agriculture was first developed, and it was there that the early great cities grew. In those open plains, artificial defenses were needed, hence fortresses—or cities if you please—were founded. The original walls after a time were unable to hold the increasing population, and a lower or outer town began expanding about the ramparts, surrounding them as an acropolis. Thus Carthage grew about the Byrsa which Dido had founded; and Rome spread out beyond the Palatine, and the various walls mark epochs in the development of the Eternal City. The names of many old towns refer to the old fortifications. Think of the number of towns in Germany with the final syllable—*burg;* thus, Hamburg, Augsburg, Madgeburg, Weissenburg, Rothenburg, etc. Now *burg* or *burgh* or *borough* means a corporate town; a burgher is a citizen; yet originally a burg was a castle. *Castrum* denoted a Roman military camp, and because people flocked there for protection,—and that was particularly the case in the border provinces—such *castra* became the nuclei of towns; thus we have the names Manchester, Colchester, Gloucester, Leicester, Lancaster, etc., to remind us of the old defenses. The Arabic *El-Kasr* and the Spanish *Alcazar* are similar terms.

Progressive Change in Character

As long as protection was the main function of towns, there was little difference between them except in size. In our day towns in barbarous or semi-barbarous countries, which are deemed important enough to be marked on the map, are simply more populous, but in no way more advanced, than the humble villages which exist unrecorded. Without increasing division of labor and improvement in commerce, we have simply large villages but no cities. To this day we see in the village towns of Hungary and Russia rural communities, the members of which live by tilling the neighboring land. The founders of towns had to look to immediate advantages; good building site, good building materials, good water supply, etc. Sometimes they builded better than they knew, or else we must credit them with keenness of prevision. The combination of a number of favorable factors was necessary for continuance and growth. Some settlements have had a remarkably long life. Archaeologists have shown that in the ruins of Hissarlik, which Schliemann proved to be the site of ancient Troy, are the remains of a town which flourished from 3000 B. C. to 500 A. D. Constatinople, the ancient Bryzantium, has lasted for ages; of all the Alexandrias founded by Alexander the Great, the one that has endured is in the Nile delta; Marseilles, (the Massilia of the Greeks), has always been important as the gateway of the Rhone valley; and Rome seems not inaptly to be called the Eternal City.

The Importance of Transport Facilities

No one would expect to find a great city at high altitudes or on an islet in mid-ocean. Among the conditions favoring city growth, ease of communi-

cation stands first. Without transportation facilities, how could the needs of a large population be supplied? The amount of food-stuffs annually required by a large city is almost past belief. Adam Smith asserts that the surplus of the country supplies the needs of a city, and that therefore the growth of cities will be proportional to this surplus. If by country we mean the surrounding land, this dictum would apply simply to the towns of ancient and medieval times; but modern means of transportation have made cities independent of their immediate environment by enormously enlarging the area to be drawn upon, and therefore growth may continue unlimited except by transportation facilities.

Great Cities of the Ancient World Were Political Centers

In ancient times large cities were political centers; thus Nineveh and Babylon, Thebes and Memphis, flourished in the days of power of their states and then declined. These cities represented the concentrated power and progress of the state; indeed anciently the words city and state were often synonymous (the term city-state is applicable), and the conquest of the former meant destruction of the latter.

Ancient Rome

Of all the large cities of ancient days, the one that comes nearest our modern idea of big cities is Rome. Rome had overlaid the whole of Italy with a network of excellent roads, and it was situated on the Tiber near the sea; but above all, it was the capital of a world empire. All roads led to Rome, and the whole civilized world was tributary to it. The impression of the life in its streets, this jostling of a populace derived from all quarters of the then-known world, the rush and bustle of a world-mart must have been indescribable. One must have felt the beating of the heart of the world in the midst of a community formed of a union of all nations. The ear was bewildered by the uncouth sounds of a hundred tongues, the eye by the forms and colors of all races, and the costumes of all peoples. The vast majority of the citizens were fed wholly or partly at the expense of the state; and the rich and great, the purse-proud from everywhere, could display their wealth nowhere to greater advantage than at Rome. Is it a matter of wonder, then, that the offscourings of all nations made the capital their goal, and that the Roman mob was peculiarly dangerous, doubly so because of its idleness? Since by large and regular distributions of grain the government had undertaken the feeding of the mob, it was compelled to take upon itself the burden of its entertainment. Games, which even in the latter days of the Republic had been the surest means of winning popular favor, had to be used by the emperors to keep the crowd in good humor. So it happened that bread and games were regarded not as a favor of the government but as a right of the mob; and even the good emperors did not dare to turn a deaf ear to the cry "Panem et Circenses!" Such conditions, bringing together the idle rich and the idle poor, are unique in history.

But when the emperor Constantine removed the seat of government to Byzantium, which thereafter was known as Constantinople, the decay of Rome, which had long been preparing, became frightfully evident. The barbarian inroads did the rest. In early medieval times stillness reigned on the Seven Hills, and the Roman forum was called *Campo Vaccino,* and rightly so, for it was a mere cow-pasture. But Rome conquered the world twice: once with the sword and then with the cross; and crowds of devout pilgrims brought life and wealth to the banks of the Tiber. Again Rome declined when under French pressure the Papal court was removed for a time to Avignon; but in our day a great revival has taken place by Rome's becoming the capital of united Italy.

Cosmopolitan Character of American Cities

Many modern cities far exceed ancient Rome in population and are nearly as cosmopolitan as far as its composition is concerned. Without exaggeration we may say of New York that besides being the greatest American city, it is an Irish city far ahead of Cork (hence the suggestion to change Y to C); it is a German city much greater than Frankfurt on the Main; an English city fully equal to Southampton and Plymouth combined; a Jewish city far more populous than Jerusalem in its palmiest days; an Italian city which outnumbers Venice, and a Russian city much larger than Astrachan. While the number of Chinese is considerable, relatively it is not large and does not invite comparison; but the negroes are numerous enough to fill thousands of kraals in Central Africa. Truly Zangwill was right when he called this the melting-pot.

Let us look at the American city next in size from another viewpoint. At Chicago the atmosphere vibrates to the sound of about 40 different languages; periodicals are printed in 10 languages; and 20 languages—of which however at least two (Latin and Hebrew) are called dead—are employed in religious services.

The Modern City

The growth of big cities other than centers of power is an altogether modern phenomenon, and is based on wholesale industry and commerce of world-wide extent. Especially in the last generation have the big cities increased in number and in size. Nowadays cities may arise in districts unable adequately to feed them. The whole world is drawn upon to furnish food for London: grain and flour are imported from America, Russia, the Danubian countries, and India; the United States, Argentina, and Australia furnish meat; eggs come from France, Germany, and Russia; butter is supplied by Denmark, the Netherlands, Australia, and New Zealand; fresh fruit is sent by France, Spain, Italy, and even California. Thus the big city becomes independent of its neighborhood and depends more and more on imports. Such conditions make it possible for a city to develop in a region where, hitherto, the merest village could not have existed. Thus Coolgardie and Kalgoorlie,

of whose existence most people are innocent, and which in spite of their queer names are thriving towns, have shot up mushroom-like near the West Australian gold fields in an absolute desert. What a contrast! The cosmopolitan life and modern comforts in the business section, then a view from a tower out on the dreary expanse around! You realize in spite of your modern surroundings that you are in "the land of sin, of sun, of sand, of sweat, of salt, of sorrow and of sore eyes." What has wrought this miracle? An enormous pipe line which conveys the much-needed water from the distant Darling Mountains, and the railway which brings supplies from Perth on the coast.

Rapid transit which made the big city possible has also caused a specialization in its growth. Trade and industry are concentrated at the center where in day-time there is a congestion of human and mechanical activity, while the same locality is still and deserted by night. The buildings here are not dwelling places, but factories, elevators, storehouses, sales-rooms, and office structures. Here is the ground favorable to the growth of sky-scrapers, which are giving the business section of many American cities a characteristic sky-line: the tendency to build in a vertical direction grows with the cost of the building site.

Labor and exchange go on in the city proper, the business center, while dwelling houses are erected at the periphery. Here we have centralization of one kind and expansion of another. Thus the city invades the country; but modern conveyances bring the suburbs close to the center. As far as habitation is concerned, the city is, as it were, hollowed out; a populated circumference about an empty center. As to movement of the inhabitants there is a centripetal influence in the morning, a centrifugal tendency toward night; again early in the evening there is an inward surge to places of amusement and a counter-current late at night. Where are the big cities found? Take an outline map and mark the big cities and their number of inhabitants; mark also the number of inhabitants of the countries or sections of countries where they are located and the density of population of those areas. Then compare England or the Netherlands with Russia, India with Siberia, West Russia with East Russia, the Rhine province of Germany with Mecklenburg, the eastern part of the United States with the West. It will be found that the most densely populated regions have the greatest number of cities and the largest cities. It may be stated as a rule that the denser the population, the higher is the percentage of city dwellers. There is no rule without exception, and Australia is a notable one. The map study will also show, as is implied above, that the earth's surface is differentiated into densely and sparsely-populated areas, and that the density of population is greater in industrial and commercial regions, less in agricultural districts and least where the surface is too rugged or too dry or where heat or cold is extreme. That means the big cities are in favorable situations in the temperate zone. Exceptionally, improved means of transportation have rendered possible the growth of large cities under very unfavorable conditions; and this very fact makes strikingly evident that cities are the most artificial objects of geographical study. Two

movements of population are characteristic of the present time; one is from old and densely populated countries to newly developed and thinly settled parts, the other is from the country to the city. If you watch the stream of immigrants at Ellis Island, the former kind of migration may be more apparent, yet the second kind, though less obtrusive, has been far steadier and much more general. Big cities have grown not from within by a prodigious birth-rate and a low death-rate, but from without by accretion. A law similar to that of gravitation might be formulated for the attraction of great cities.

The City and the Country

By high pressure industry and a world-wide commerce, the city serves the important function of giving employment to the surplus population of the country. Agricultural machines and labor-saving devices of all kinds have rendered unnecessary much of the labor once required in farming. But when it is difficult to bring in the harvest, when necessary hands cannot be hired in the country, when neglected and deserted farms proclaim a retrogression of agriculture, then the cityward trend becomes alarming. No wonder that there is a "back to farm" agitation here and elsewhere. Special study and attention is given to the betterment of conditions of rural life; agricultural colleges are exerting their influence; and farmers' institutes, rural social surveys, efforts of railroads, industrial corporations, and bankers' organizations, the offering of agricultural courses even in large city high schools, all give evidence of the wish to stem the tide.

In the complex life of modern times, the city is a necessary and important factor. The number and size of its cities may be taken as a gauge of the advance of a nation; and no part is more sensitive in responding to the ebb and flow of its prosperity. That the city growth has at times been inordinate and unhealthy is unfortunate for both city and country.

In the discussions of the cityward movement there have been bitter partisan expressions. No doubt it is true that agriculture is the source of civilization, and that it feeds industry and trade, the arts and the sciences; and the saying of Frederick the Great still holds that "agriculture is the first of all arts; without it there would be no merchants, no poets, no philosophers; and only that is true wealth that is produced by the earth." But it is not true that our large cities are economically passive, non-producing, and strongly consuming parts of the social organization; on the contrary they are the scenes of greatest activity, most concentrated, specialized work, and most intense production. By a process of social selection the big cities display the greatest mental and economic energy; and in the modern march of progress, they are the standard bearers.

OVERLOOKED BOHEMIA

By Eugene Van Cleef
State Normal School, Duluth, Minn.

SINCE the beginning of the European conflict essentially nothing has been said about Bohemia, for it is only one of the several provinces of the dual kingdom, Austria-Hungary. Even during times of peace little mention has been made of this important garden of central Europe. As a matter of facts it constitutes a physical unit that has played a most significant role in the shaping of the countries of Europe; it will undoubtedly come upon the stage once more to play perhaps an equally important part. In view of these conditions, a few observations with some conclusions, all briefly considered, may prove worth while.

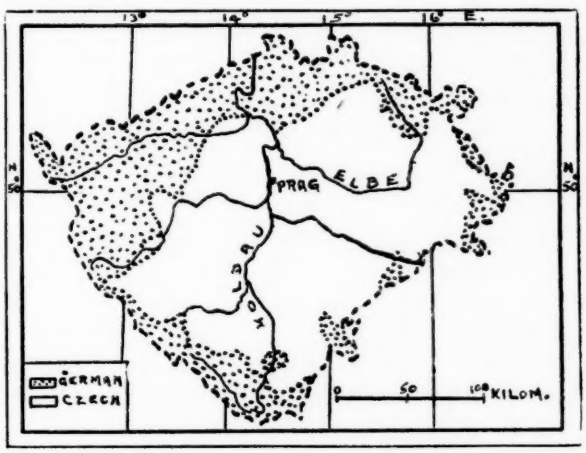


Fig. I.—Map of Bohemia, showing the Distribution of Germans and Czechs. After Hettner-Landerkunde Europa.

Location.—Bohemia lies almost exactly half way between the Adriatic Sea and the Baltic. The city of Prag*, almost in its exact center is practically midway between the meridan of 0° passing through London (Greenwich) and the meridian of 30°E. on which Petrograd lies. One of the great arteries of transcontinental trade connecting the North Sea and the Black Sea makes a pathway through central Bohemia. So far as centrality is concerned the province could hardly be better located.

Surface.—Its area (20,065 sq. miles) is less than half that of New York State. It is not however so nearly a plain. Almost the entire surface possesses considerable relief. Only along the southeastern boundary line is the otherwise continuous mountain girdle broken. The Risengebirge along the northeast boundary, the Erzgebirge along the northwest, and the Bohemian Forest along the southwest, are well defined ranges with a maximum altitude

*The spelling used by the citizens of Prag will be adopted here instead of the Anglicized form Prague.

in the Riesengebirge of about 5300 feet (the Schneekoppe). The average heights range much closer to 2000—3000 feet. The Bohemian-Moravian hills along the southeast include a considerably dissected upland of approximately 1000 feet elevation. These mountains are of igneous origin while those in the interior through which the Elbe has cut its valley are recently-formed sedimentary rocks. All of the rocks of Bohemia have weathered into fertile soils at their surfaces.

Climate.—The climate in many respects approaches the ideal. Summers are warm but not excessively hot, while winters are cool but not extremely so. The temperatures for Prag, which may be taken as fairly representative of the interior, range from about 30°F. in January to 68°F. in July. Of course as one ascends the highlands the temperatures will lower. A few of the mountain tops, especially in the Riesengebirge, are covered with dome snow the larger part of the year. The annual rainfall in the central portion is about 19.6″ which increases to as high as 50″ toward the surrounding mountain summits.*

Agriculture.—Such a continental climate combined with the remarkable fertility of the soil gives to Bohemia an agricultural resource that many a country would gladly cherish. Among the numerous crops are hops, potatoes, sugar-beets; small fruits, such as grapes, cherries, apples, and plums. Most of the grains are represented, principally wheat, rye, and flax. Geese, cattle, and swine are the most important farm animals. Although most of the crops are grown everywhere, some of the sections have become especially noted for certain crops. Melnik, on the Elbe, is the vineyard center; Saaz on the Eger is noted for its hops, large quantities of which find their way to America. The villages south of Prag rank first as owners of geese. The vallay of the Elbe, particularly in the neighborhood of Kralup, is the sugar-beet center.

Although orchards occur frequently, a very considerable portion of the fruit crop is grown along the roadways. Cherry, plum, and apple trees are utilized as shade trees thereby serving an efficient double purpose. Recognition of strictly enforced laws saves these crops from the fate they usually suffer in our country when so publicly exposed. Nearly one-third of the land is in possession of large landholders, usually of title. As a result forest preserves are still extensive—not entirely to the best interests of the masses.

Minerals.—Bohemia's mineral resources also rank high. With the exception of salt, probably no mineral is lacking in her numerous hills. Coal, particularly lignite (Braunkohle), is in abundance, especially in the Eger valley near its junction with the Elbe. Iron, and coal (mostly anthracite), occur in quantity in the region about Pilsen. Silver, lead, garnets, copper, nickel, cobalt, kaolin, quartz from which glass sand is derived, tungsten, tin, and alum make a rather formidable array of minerals, a complete list of which would be too long to detail here.

*It will be necessary here to omit the remaining climatic elements.

Communications.—The break through the Erzgebirge in northeastern Bohemia is the "Iron Gate" of the Elbe. Here lies the single easy entrance to Bohemia from the north. Though the Erzgebirge are not high, only occasionally reaching 4000 feet, their inner or Bohemian slope is very abrupt and hence traversed with difficulty. Thus the route of the Elbe becomes at once an important highway. The Germans filter through and the Bohemians occasionally wander out. The result is a mixture of peoples in Bohemia.

People.—The inhabitants are divided into German Bohemians, many of them pure Germans, and Czechs. The word "German" is prefixed before "Bohemians" because the German of Bohemia exhibits somewhat different characteristics from his brother in Germany. About one-third of the 6,769,548 people is German and the remainder Czech. Along the west bank of the Elbe for considerable distances north of Prag, Czech towns predominate; along the east bank German towns. In nearly all of the cities both German and Czech schools are represented. But such antipathy has developed between them that the respective masses refuse to use each other's language or to even acknowledge that they understand one another.

Cities.—The industrial centers of the mountain areas with the exception of the southeastern districts, are occupied by the Germans (see Fig. 1). Mining at the foot of the Erzgebirge and cotton, wool, linen, and glass manufacturing are very largely under German control. The culmination of German industry in this foreign land is perhaps best appreciated in Reichenberg (pop. 35,000) located on the Neiss River where it controls the important pass leading to Saxony and Silesia. In Reichenberg the struggle between German and Czech has reached serious proportions only lately, with the former however still holding the upper hand. Prag (pop. 541,000) the capital city and a growing industrial center, has not been able to maintain itself as a German city. It is a pure Czech town today, although 50 years ago it was not so. Now only one-sixth of its population is German.

Other towns of importance that might be mentioned in passing are Aussig (pop. 40,000), a river harbor on the Elbe for the distribution of lignite and a limited quantity of lumber; Pilsen (pop. 80,000) in the west on the Beraun River, the city which has given the world-renowned name to "Pilsener" beer. In the southern part of the country on the upper Moldau, in control of the important road to Linz on the Danube, lies the rival city of Budweis (pop. 45,000), whose name also is well known. Large cities are generally absent. On the other hand the many small cities give a relatively even distribution of population. It is probable that the occurrence of minerals in nearly all parts coupled with highly fertile lands everywhere conduces to this distribution.

History.—Bohemia was first invaded by a tribe of Kelts called *Bojern,* from whom it seems the province derived its name. The territory was organized into a province about the 10th century and ruled by the dukes of the House of Premysl, who in turn acknowledged control by the kings of German territory. The beginning of the Thirty Years' War in 1618 was the result

of Bohemian resistance to Hapsburg rule. This proved for a while a serious menace to the Germans. The revolt however failed so far as Bohemia's aspirations were concerned.

In 1848 insurrection was again the rule. The Czechs demanded that their language be given the same recognition as the German in the courts of Vienna. A Pan-Slavic Congress was called attended by Czechs, Moravians, Ruthenians, Servians, and Croatians. During the first few days a local insurrection brought out the Austrian army and resulted in the breaking up of the Congress and the establishment of a military government. The hopes for Bohemian independence were again crushed.

Present Conditions.—It is clear that the Germans have had a vital interest in Bohemian territory. When the alliance of Germany with Austria-Hungary was effected it seems hardly possible that it was for purely military purposes. Economic reasons were probably equally as potent. Germany's limited agricultural resources, as is generally known, have necessitated large importations of foodstuffs. Quite in contrast Bohemia can easily raise sufficient for her people. In fact she has a surplus which Germany can well utilize. With the realization that in war times it might be possible to cut off food importations, an alliance with Austria would insure a source of supply sufficient to save her from disaster, temporarily at least.

While the facts are not available to the writer, it seems more than probable that the remarkable endurance shown by Germany in the present war is in no small degree due to the alliance with Bohemia (that is, Bohemia as a part of Austria). Naturally the Austrian armies need supplies too and are drawing upon the same source. But when it is realized that food "goes much further" in war times, the presence of Austria in the ranks still allows of some supplies for Germany. It has been admitted, with reluctance, by some who are in a position to know, that although Bohemia is a physical unit Germany would enjoy very much having her as a part of the empire.

Riding through Bohemia one observes green fields everywhere. The tracts are not large to be sure, but there are many of them. The density of population does not permit of such bonanza farms as in our country. Cultivation is entirely intensive. Probably no part of continental Europe is more productive both of foodstuffs and minerals than Bohemia. No section contiguous to Germany could be more valuable. Yet perhaps no territory upon her boundary line is more nearly a perfect physical unit.

Bohemia has not yet been developed to its limit of possibilities. It has tremendous opportunities. But as long as Czech opposes German and militarism opposes Czech there can be but little more progress than the past few years have seen. As a physical unit and therefor logically a potential political unit, Bohemia should eventually become an independent country.

HARBORS OF SOUTH AMERICA

By Henry F. James
High School, Madison, Wis.

THE prosperity of some countries depends largely on commerce. Modern commerce depends much on the ocean highways, but owes its rapid development in part to favorable coast lines and harbors through which access to the sea is secured. Countries with an unfavorable sea-coast like Russia, or with a small extent of coast line, like Austria, are handicapped when compared with a country like the United States with fairly good coasts on three sides.

Characteristics of a Good Harbor

(1) A good harbor must first of all afford shelter from stormy seas, must be deep enough for large vessels to reach the piers, must be connected with the open ocean by a deep channel, and must provide ample room for the anchorage of many ships.

(2) It must have convenient internal routes to a rich hinterland, one that is a large producing or consuming region or both. Harbors at the mouths of large rivers are likely to have easy communication with the interior by means of river navigation, and the valleys are natural routes for railways.

(3) It must be in the hands of a far-sighted government, for few harbors are naturally suited to all the demands of present-day commerce, and it is necessary for vast expenditures to be made before they are entirely suitable.

General Features of the Coast

South America is very dependent upon the sea for means of communication; however, it is poorly endowed with harbors. The indentations of its shore line afford surprisingly few natural harbors capable of affording safe and accessible havens for maritime trade without enormous outlays in protective works and docks. Seaports, such as exist in Europe and North America, deeply indented and well sheltered are rare, and the heavy outlay for harbor works forms one of the most serious items in the budgets of the South American Republics. On both coasts, yellow fever, plague, smallpox, and malaria, have been a scourge for centuries. However, it is shown that these scourges are the result of human negligence rather than of uncontrollable natural conditions. Added to these are the earthquake and tidal wave, which so frequently occur on the western side of the continent in the past and may occur at any time.

South American Rivers

The important navigable rivers of South America are confined to the Atlantic and Caribbean slopes. The Pacific slope rivers of Chile and Peru are mainly of value for irrigation.

It is upon the Amazon and its great stretches of navigable waterway, the Rio de la Plata and its tributaries, and the Orinoco and the Magdalena on the north, that the continent depends for its natural means of communication.

The Amazon.—The main trunk of the Amazon is four thousand miles in length, navigable for ocean steamers for nearly 3,000 miles from its mouth, and, with its branches, affording 25,000 miles of navigable water.

The La Plata.—The La Plata system is scarcely less useful; the Parana is navigable for vessels of 12 feet draught as far as the city of Parana, 300 miles above Buenos Aires; and to Rosario, 185 miles above Buenos Aires, for vessels of 15 feet draught; above Parana the river is navigable for vessels drawing ten feet of water as far as Asuncion, 970 miles above Buenos Aires. Portions of river still farther up are navigable for smaller craft.

The Orinoco.—The Orinoco is navigable for large steamers of stern-wheel type throughout the year to Cuidad Bolivar, a town some 375 miles from its mouth.

Western South America

The Pacific coast line is about 4500 miles long; it has few good harbors and has very difficult communication with the interior. The principal ports are Guayaquil, Callao, Valparaiso, Iquique, and Esmeraldas.

Colombia's Pacific coast line has a length of about 500 miles; it has been of slight service in the development of the country, because of the unsettled and unhealthy character of the coast region, and the high mountain barriers between it and the settled parts of the republic. There are only two commercial ports on this coast, neither of them important, Tumaco and Buenaventura, though there are other natural harbors which will be of service if there is ever any demand for them. This coast has no railroad connection with the interior.

Ecuador.—The bays on this coast are commonly broad, open indentations and the rivers discharging into them are obstructed by bars. The harbor of Esmeraldas is near the mouth of the Santiago River, which is obstructed by a bar across its mouth so that ships anchor outside in an open roadstead, only slightly protected.

Guayaquil.—The gulf of Guayaquil is the largest gulf on the Pacific coast of South America. Its mouth is 140 miles wide and it penetrates into the land 100 miles, terminating in the Guayas estuary. Steamers drawing 22 feet can anchor at its landward end at the port of Guayaquil, one of the most important South American ports on the Pacific; 90% of the foreign commerce of Ecuador, amounting to approximately $20,000,000, annually passes through this port. A railroad, 290 miles long, built a few years ago, runs between Guayaquil and the Capital, Quito, but the other means of interior communication are primitive.

Peru.—The coast line of Peru has few protected anchorages and the headlands are generally abrupt and lofty. The coast itself is nearly as destitute of vegetation as the African Sahara. There are several harbors, but with the exception of Callao, they are generally small, open roadsteads where landing is difficult.

Callao, the chief coast town of Peru and the port of Lima, almost monopolizes the foreign trade. Its harbor, one of the best on the western coast of South America, has been greatly improved by port works which were built at a cost of $10,000,000 and which allow the largest steamships to lie alongside the quays in comparatively quiet water, protected on all sides. In 1912 the foreign commerce of Peru amounted to $70,000,000, the largest part passing through Callao. The only communication with the interior is by a single line of railway to Lima, and by primitive roads and mule paths.

CHILE.—The coast of northern Chile is singularly deficient in good harbors. Those of the desert regions, the nitrate ports of Antofogasta and Migillones, are only slight indentations in a remarkably uniform coast line, sheltered on one side by a point of land or small island; the landings are generally dangerous because of the surf, and the anchorages are unprotected from storms. Conception at the head of Talcahuana Bay is the chief port and best harbor of Central Chile, and is the naval stronghold of the republic.

Valparaiso.—Valparaiso is situated on a broad, open bay slightly over three miles wide. Good shelter is afforded from southerly and westerly storms, but the bay is open to those from the north. Often vessels have to slip their anchor and put to sea to avoid destruction during a northerly gale. There are two lines of railways connecting it with the interior, the transcontinental line between Valparaiso and Buenos Aires and the government line to Santiago. The foreign trade of Chile in 1912 was $250,000,000, with over half passing through Valparaiso. The southern 1000 miles of the Chilean coast contains a perfect succession of bays and inlets affording safe harbors, but the mainland and the islands are practically uninhabited and the climate is uninviting.

NORTHERN COAST OF SOUTH AMERICA

The northern or Caribbean coast of South America contains the harbors of Baranquilla, Cartagena, Maracaibo, and La Guaira.

COLOMBIA.—The Caribbean coast line of Colombia has a length of 700 miles, with bays of considerable size at Tumaco, Choco, Magdalena, Cabita, and Octavia; some of them afford exceptionally safe and well sheltered harbors. The most important harbor is Baranquilla.

Baranquilla.—The principal port of the Republic is situated on the Magdalena River, the chief means of communication with the interior. Its seaport or landing place, is Puerto Colombia, where a steel pier 4,000 feet long has been built out to deep water, alongside which ocean-going vessels can receive and discharge cargo. The bay is slowly filling with the silt brought down by the river. The port is extremely well situated, for the one outlet of Colombia is the Magdalena River.

Cartagena.—The best port on the coast lies about sixty-five miles southwest of Baranquilla. The harbor is shut in by two long islands lying parallel to the mainland, and affords deep and secure anchorage and ample facili-

ties for loading and unloading vessels of large size. The city itself has no modern quays and large vessels do not approach within a mile of its landing stages, but the railroad pier on the mainland opposite permits the mooring of the vessels alongside. The city is connected by a short railroad to the Magdalena River.

VENEZUELA.—The coast line is 1876 miles long and has thirty-two harbors, large and small; comparatively few of these, however, are open to foreign commerce. The large indentations are (1) the Gulf of Maracaibo, (2) the Gulf of Paria, between the peninsula of that name and the island of Trinidad, (3) the Gulf of Cora and the Gulf of Cariaco. The commerce of these ports, both foreign and domestic, is small. The foreign commerce in 1908 amounted to approximately $24,000,000. The commerce of Venezuela is small, due to the fact that tariff schedules are exhorbitant; much of the coast is fever stricken, the people impoverished, and the government wretched. Communication with the interior is difficult; the entire republic has only 540 miles of railroad. The two leading ports are La Guaira and Maracaibo.

La Guaira.—La Guaira is situated on the north central coast; it has the reputation among sailors of having the worst harbor in the world. It is merely an open roadstead beset by many dangers and difficulties. The harbor has been improved, however, by the construction of a concrete breakwater running out 2,044 feet. This port carries on about 52% of the foreign trade of the Republic.

Maracaibo.—On the west shore of Lake Maracaibo is one of the principal commercial centers and shipping ports on the northern coast. The bar at the entrance to the channel does not admit vessels drawing more than 12 feet, but there is a depth of 30 feet inside and near the city. The interior communications, both by river and railway, are fair, the rivers being navigable for short distances into the coffee regions.

THE GUIANAS.—The three Guianas, British, French, and Dutch, have a poor coast line; the leading harbors have bars at their mouths which prevent the largest vessels from entering. Communication into the interior is fair, for the two most important rivers are navigable for a distance of 50 miles into the interior. The most important ports are Cayenne, where the harbor is so shallow at its entrance that craft drawing more than 14 feet of water are obliged to anchor six miles from the town; Georgetown, British Guiana, and Paramaribo, Dutch Guiana.

THE ATLANTIC COAST

The eastern coast of South America is favored, for the most important and best of her harbors are situated on the greatest highway of commerce, the Atlantic Ocean.

BRAZIL.—The coast of Brazil is indented with a number of almost land locked bays, spacious and accessible. The most important are Santos and Rio de Janeiro. Communication with the interior by the rivers of the plateau is

restricted, but the Amazon furnishes excellent navigation into the interior. The only ports having a rich and populous country behind them are Rio de Janeiro, Santos, and Bahia and these are the termini of important lines of railway into the interior.

Rio de Janeiro.—The harbor of Rio is the largest and most important in Brazil and one of the finest in the world. The entrance is open to vessels of the largest size. The bay is 100 miles in circumference and almost everywhere 60 feet deep. The commercial quays are built in deep water and permit the mooring alongside of the largest vessels. The total length of the quay is about 3800 yards. The new port works, under construction since 1903, consist of a very expensive and ornamental water-front and a continuation of the sea wall southward. Rio is the seaport for a large area of the richest, most important, and most thickly settled part of Brazil. Its exports amount to 2/5 of the entire exports of the country, and its imports are relatively as large. It is well connected with the interior by important lines of railway and has also regular steamship communication with the principal ports of Europe and America.

Bahia is situated on the bay of All Saints, a horseshoe shaped bay, ten miles wide at the entrance, twenty-seven miles long, and in the center about twenty miles wide. The harbor is sheltered; steamers cannot approach the dock, but lie at anchor in the bay about a mile from shore in still water. Railways give it excellent connection with the interior.

Recife or Pernambuco is one of the important ports of Brazil, on account of its proximity to Europe. Its harbor consists of an outer and inner anchorage, the former an open roadstead separated from the latter by a remarkable stone reef. The harbor has been improved at a cost of $8,000,000. Steamers, unless they draw less than 23 feet of water, do not go within the reef, but lie at anchor about a mile outside. The general level of the city and neighboring coast is too low to be healthy and it has a high death rate. The railway communications with the interior are good.

Para, the entrepot for the Amazon valley and the principal commercial city of northern Brazil, lies at the junction of the Guama and Para rivers, about 86 miles from the Atlantic Ocean. The Para is about 20 miles wide here. The harbor is accessible to large steamers, but those of light draft only can lie alongside the quay, the larger vessels being compelled to anchor some distance out. Communication with the interior by large vessels is possible by the Amazon.

ARGENTINE REPUBLIC.—Although having a great extent of coast line, Argentina has few good harbors. The two most frequented by ocean going vessels are Buenos Aires and Ensenada (LaPlata) both of which have been improved at great expense. The best natural harbor is that of Bahia Blanca, about 530 miles by sea south of Buenos Aires. About 100 miles south of Bahia Blanca is the sheltered port of San Blas and between the 42nd and 43rd parallels are the land-locked bays of San Jose and Nueva, the first as yet un-

used. North of Buenos Aires on the Parana River is the port of Rosario, the outlet of a rich agricultural district, ranking next to the federal capital in importance. The principal centers of the railway system, approximating 13,000 miles, are Buenos Aires and Bahia Blanca, while the La Plata river-system furnishes excellent means of interior communication. The foreign trade in 1913 amounted to $900,000,000.

Buenos Aires.—Buenos Aires is situated on the west shore of the La Plata estuary, about 55 miles above its mouth. The estuary at this point is 34 miles wide and so shallow that vessels can enter the docks only through artificial channels kept open by constant dredging. Previous to the construction of the new harbor, ocean going vessels of over 15 feet draught were compelled to anchor in the outer roads, some 12 miles from the city. The communication with the shore was effected by means of steam tenders and small boats. The harbor has been improved by dredging and deepening the channel, erecting docks, and quays, installing warehouses, hydraulic cranes, and twenty-eight miles of railway-siding at a total cost of $40,000,000 up to 1908. The city is the principal terminus and port for nearly all the trunk lines of the republic.

Bahia Blanca is situated on the Naposta River, three miles from its outlet into a deep, well sheltered bay of the same name, about 447 miles by rail southwest of Buenos Aires. It is the natural shipping port of a rich district from which great quantities of wheat and wool are exported. The harbor has long been recognized as one of the best on the Argentine coast, and when the channel is properly dredged, it will admit steamers of 30 feet draught at low water. Five or six important lines of railroads connect it with its rich hinterland.

Authorities

Julia P. Canto, Progress of the Republic of Chile (1906)
C. R. Enoch, Republics of South and Central America
C. W. Domville Fife, The Great States of South America
A. H. Hale, The South Americans
F. D. and A. J. Herbertson, Central and South America with The West Indies
A. H. Keane, Central and South America, Volume I-II
Elesie Reclus, Universal Geography, Volume XIX, p. 77-291
Statesman's Year Book, 1914

Precious Metals in Alaska

The annual statement on gold, silver, and copper in Alaska for 1914 has just been issued by the United States Geological Survey. The value of the total output of these three precious metals for the year aggregated $18,835,520.

GLACIERS AND GLACIATION OF SOUTH AMERICA*

By Walter H. Schoewe
Milwaukee, Wis.

The Snow Line

THE snow line of South America varies from north to south according to latitude and elevation and from east to west according to the wind belts. From northern Colombia at an elevation of 16,000 ft. the snow line gradually descends to 15,000 ft. at the equator from which place it rapidly ascends to 17,500 ft. in northern Peru and 20,000 ft. in the sub-tropical high pressure regions situated between latitude 17° and 27°S. From this highest snow line limit, the snow line gradually sinks to 1700 ft. at the extreme southern tip of the continent. The eastern mountains carry the lower snow line in the region north of the equator and in the sub-tropical pressure belts, due to the abundant precipitation from the Trade Winds, while south of the high pressure belt, the Prevailing Westerlies supply the coast mountains with the most moisture.

The Present Day Glaciers

The Tropical Glaciers.—The glaciers of South America can conveniently be grouped into three divisions. The first division, the tropical glaciers, which include all ice streams lying north of Chili in consequence of their position in high latitudes are, as one might readily expect, small and end at high elevations. Furthermore they all seem to be receding, as their numerous moraines now testify. True valley glaciers of the alpine type do not exist in the tropical region of South America. Instead, only small hanging and cirque glaciers are found. In central Peru, the ice streams now end at 16,000 ft.; at 16,000 ft. in eastern Bolivia between 16° and 21°S. latitude; and at 15,000 ft. and 15,000 ft. in the eastern and western Cordillera of Ecuador respectively. In Colombia, the ice tongues reach down as far as 16,000 ft.

Characteristic of the tropical glaciers is the fact that the amount of water yielded to the streams by the melting ice tongues is extremely small. This condition as well as the curiously dry, stony appearance of the ice, which looks more like granite than compacted snow, is explained by the relative rapidity of evaporation which takes place over the high tropical glaciers. The extensive formation of large sized *nieve penitente* and ice cascading avalanches are also very characteristic of these glaciers. The noise of running water, the slipping of stones, the cracking in the substance of the glacier, all so characteristic of the glaciers of the Alps, are practically unknown in the regions of the tropical glaciers.

In the caldera of some of the extinct volcanoes, large ice masses collect. Thus, in the crater of Cerro Altar, 1°54′ S. latitude is found an ice field

*Summary of a paper presented in the Geographical Seminary at the University of Wisconsin and submitted to the criticism of Prof. Lawrence Martin.

3,300 ft. wide. The sea of ice finally escapes through an opening in the crater rim. The glacial tongue descends a valley for a distance of 1½ miles where it is discharged as ice avalanches over precipitious rocky walls into a gully below. This 1½ mile-long glacier is the nearest approach to a true alpine glacier.

The Temperate Glaciers.—These include all the glaciers in Chili and Argentina as far south as 46°S. latitude. Not only have they greater length and a more truly alpine character, but they naturally terminate at lower elevations. Lying in the central Cordillera between Aconcagua and Tupungato in latitude 32°—33°S. are approximately 25 glaciers. Many of these descend as far down as 12,000 ft., while the lowest elevation reached in this district is by the Juncal II. glacier which terminates at 9300 ft. In size the glaciers of this zone vary from small ice streams ½ mile or 1 mile in length to glaciers having a length greater than 5 mi.

The Great Glaciers of Patagonia.—Of an entirely different magnitude is the glaciation of the southern part of Chili and Argentina. The great area of snow fields and valley glaciers which extends north to about 46°S. latitude sends out to the east and west great ice streams which reach lower and lower altitudes to the southward. At least 55 glaciers or ice tongues are known to fringe the great snow-fields of the Patagonian Andes. This third glacial division is divided into a northern and a southern section, the former extending north from 47°45′S. latitude, where Baker fiord cuts across a large proportion of the width of the Cordillera, to latitude 46°S., while the latter section stretches south about 4° from the Baker fiord. In the northern section most of the glaciers end before reaching the sea. Unlike the glaciers of the northern section, practically all of the ice streams of the southern section on the western side descend to the sea where they discharge icebergs into the waters of the numerous fiords. None of the valleys are ever free from ice. In the eastern part of this southern glacial zone almost all of the ice tongues empty into glacial lakes formed by former great ice masses. The fiorded coast and the numerous large lakes are particularly characteristic of Patagonia. All of the glaciers of this region with the exception of three have been rapidly retreating when seen in recent years.

Still farther south in the great Patagonian ice zone lies the region of Tierra del Fuego with its numerous glaciated straits and fiords. One of its many glaciers, the Hassler, has been described as one mile wide and at least three miles long, in 1872, entirely free from any kind of debris, and as smooth and shining as a mirror. Notches or caves 30 to 40 feet in height and 100 feet in depth were numerous in the steep ice front. Lying in front of the glacier were numerous lakes and a series of moraines marking three different pauses.

Past Glaciation of South America

The present day glaciers of South America are only the remnants of a one-time more extensive glacial system. At present all of the known glaciers

of South America, with the exception of three of the Patagonian ice streams, are rapidly retreating. One of these advancing ice streams is the Bismark glacier in latitude 50°30′S, longitude 73°W. Since 1899 this *mer de glace* has been moving forward, while its neighbors on each side have been retreating. Between 1880 and 1899, the Bismark glacier retreated from a place in the lake into which it is again advancing. At present the glacier terminates in Lake Argentino at an elevation of 7800 ft. The glaciers of South America have within the last few decades retreated from 170 ft. to 700 ft. as their recessional moraines now testify. Sometimes between the glacier snout and the outermost moraine, a series of recessional moraines appears, occasionally as many as eight in number, indicating that the retreat of the glacier was not continuous. Such a series of seven of young moraines is found lying in front of the Hassler glacier in Tierra del Fuego.

The Former Ice Periods

Evidence of former glaciation is met within all of the Cordillera where glaciation is present now. Lateral moraines, some of which can be traced up on both sides of the valleys for over 3½ mi., numerous terminal and recessional moraines, abundant glacial lakes—some filled, others containing water —cirques, typical U-shaped valleys, *roche moutonnees,* etc., all give testimony of a once greater glaciation in the Cordillera. The many glacial lakes found in Peru and Ecuador generally lie between 13,000 and 15,800 ft. which height also practically coincides with the numerous glacial terraces found in the same countries. For the average elevation of the lower limit of moraines in Peru and Ecuador, Sievers gives the figure of 13,000 ft. This same observer also found that the moraines of the western Cordillera descended to lower elevations than those in the eastern mountains. Not only did the moraines descend lower in the western Cordillera, but also the typical U-shaped valleys occupied lower positions, were more numerous, and better developed than those to the east, thus showing that the western Cordillera received the larger glaciation.

From the observations and reports of the Chili-Argentina Boundary Commission (1896-1902) it is now known that at the time of maximum glaciation, the Patagonian glaciers extended eastward to the Atlantic ocean at 49°S. latitude whence the edge of the ice took a northwesterly direction to longitude 70°W. and then maintained a northerly course practically coinciding with that meridian. Hauthal's conclusion regarding the glaciers of Patagonia today is that the character of the former ice tongues was identical with that of today, except that the earlier ice field was of much vaster extent.

According to Meyer and Hauthal there are at least two, probably three, separate glacial periods represented in South America. Of these, the first one was the greater of the two. In Peru and Bolivia, Hauthal believes he found evidence of the first period of glaciation as low as 12,000 ft. and 10,000 ft.; according to this, the snow line must have been between 13,000 ft. to 15,000 ft. altitude. The same observer was able somewhat more ac-

curately to fix the snow line of the second glacial period between 16,000 ft. to 17,000 ft. and the glacier limit around 14,000 ft., while Sievers places the glacier limit at 13,000 ft. According to Meyer's observations the glaciers in Ecuador ended during the second glacial epoch between 12,000 ft. and 13,000 ft. In round numbers the lower glacial limit of the former ice periods in the tropical glacial zone lay from 3,000 ft. to 4,000 ft. lower than at present.

According to Hauthal and others, mountain glaciation of the earlier periods was not greatly different than that of today. In the ice periods the same climatic harmony predominated as does today, only several octaves lower. Exactly as today, the earlier glaciers received their local coloration, their local toning off through the local climatic relationships, that is, where now the snow line lies high as a result of a dry climate, there also the snow line had a high position during the former ice periods and vice versa. The general climate of South America during the earlier ice periods, on the other hand, differed from the general climate of the country today in being colder and having a greater amount of precipitation.

Not only was a larger area in and near the mountains of South America glaciated during Quaternary time, but evidence in the form of tillite also points to a Permo-Carboniferous glaciation. South of the equator a zone of this Paleozoic glaciation has been found; its limits have not been determined, but it is known to have extended between 21° to 35°S. latitude.

Bibliography

Agassiz, E., "The Hassler Glacier in the Straits of Magellan," *Atlantic Monthly,* Oct. 1872, pp. 472-478.

Benrath A., "Uber eine Eiszeit in der peruanischen Kustenkordillere," *Petermann Mitt.,* Vol. 50, 1904, pp. 268-270.

Bingham, H., "The Wonderland of Peru," *Nat. Geogr. Mag.,* Vol. 24, 1913, pp. 539-541.

Banner, J. C., "The Supposed Glaciation of Brazil," *Jour. Geol.,* Vol. 1, 1893, pp. 753-772.

Bruckner, E., "Die Schmelzformen des Firns im tropischen und subtropischen Hochgebirge," *Zeitschrift f. Gletcherk,* Vol. 2, No. 4, 1908, pp. 292-296.

Conway, M., "Climbing and Exploration in the Bolivian Andes."

Darwin, C., "Geological Observations, Voyage of H. M. S. Beagle."

Fitz, Gerald E., "The Highest Andes."

Hauthal, R., "Der Bismark Gletcher, ein vorruckender Gletcher in den patagonischen Cordillere," *Zeitschrift f. Gletcherk,* Vol. 5, No. 2, Dec. 1910, pp. 133-143.

Hauthal, R., "Gletcherbilder aus den Argentinischen Cordillere," *Zeitschrift des Deutchen und Osterreichischen Alpenvereihn f. das Jahr,* 1904.

Hauthal, R., "Reisen in Bolivian und Peru," *Wiss. Verof. der Gesell. f. Erdkunde zu Leipzig,* Vol. 7, 1911, pp. 169-183.

Hettner, A., "The Bolivian East Kordillera," *Vehr. d. Gesell-f. Erdk.zu Berlin,* 1890.

Kruger, P., "Die patagonischen Anden zwischen dem 42 und 44 Grade Sudlicher Breite," *Petermann Mitt.* Erganzungsheft 164.

Meyer, H., "Der Calderagletcher des Cerro Altar in Ecuador," *Zeitschrift f. Gletcherk,* Vol. 1, No. 2, July, 1906, pp. 139-148.

Meyer, H., "In der Hochanden von Ecuador."

Meyer, H., "Zur Geschichte der glazialen Erforschung Sudamerikas," *Petermann Mitt.,* 1908, No. 5.

Partsch, J., "Hans Meyer's Gletcherbeobachtungen in den Hochanden von Ecuador," *Zeitschrift f. Gletcherk,* Vol. 2, No. 2, March, 1907, pp. 128-136.

Paschinger. P., "Die Schneegrenze in verschiedenen Klimaten," *Petermann Mitt.,* Erganzungsheft 173, pp. 35, 39-46.

Pfordte, F., "The Glaciers of Poto, Peru," Rep. 8, Intern. Geogr. Congress, Washington, 1904, p. 499.

Reichert, F., "Das Gletchergebiet zwischen Aconcagua und Tupungato," *Zeitschrift f. Gletcherk,* Vol. 4, No. 4, March, 1900, pp. 193-222.

Reichert, F., "Vorlaufiger Bericht uber die Resultate der Juncal—Expedition in den Anden," *Zeitschrift f. Gletcherk,* Vol. 5, No. 4, April, 1911, pp. 298-309.

Reiss, W., and Stubel, A., "Das Hochgebrige der Republic Ecuador," *Petrographische Untersuchungen,* Bd. 2, Berlin, 1896-1902, pp. 175-185.

Schwarze, G., "Die Firngenze in America," *Wiss. Veroffentl. d. Ver. f. Erdk., Leipzig,* 1, 1891.

Sievers, Wm., "Reise in Peru und Ecuador," *Wiss. Veroffentl. d. Gesell. f. Erdk zu Leipzig,* Vol. 8, 1914, pp. 162-262.

Sievers, Wm., "Die heutige und die fruhere Vergletcherung Sudamerikas," *Sammlung wiss. Vortage aus dem Gebiete d. Naturwiss. u. d. Medizin.* 5H., Leipzig, 1911.

Sievers, Wm., "Zur Vergletcherung der Cordillere des tropischen Sudamerikas," *Zeitschrift f. Gletcherk,* Vol. 2, No. 4, April, 1908, pp. 271-285.

Steffen, H., "Das sogenannte patagonische Inlandeis," *Zeitschrift f. Gletcherk,* Vol. 8, No. 4, April, 1914, pp. 160-175.

Steffen, H., "Der Baker Fjord in West patagonian," *Petermann Mitt.,* Vol. 50, 1904, pp. 140-144.

Steinmann, G., "Uber Diluvium in Sudamerika," *Monatsberichte der Deutchen Geolog. Gesell.* Jahrg, 1906, No. 7, p. 7.

White, D., "Carboniferous Glaciation in the Southern and Eastern Hemispheres," *Jour. Geol.* Vol. 3, 1889, pp. 299-330; Ibid., ol. 15, 1907, pp. 615-633.

White, D., "Gletcherphanomene im sudlichen Chili," *Zeitschrift f. wiss. Geogr.* 1891, Vol. 8, Part I, p. 59.

Woodworth, J. B., "Permian Glacial Deposits of South Brazil," *Bull. Mus. Comp. Zool.,* Vol. 56, 1912, pp. 52-91.

OUTLINE FOR THE STUDY OF FROST AND PROTECTION AGAINST FROST DAMAGE

By William Gardner Reed
University of California, Berkeley

References: Beals, E. A.: "Forecasting frost in the North Pacific States," *U. S. Wea. Bureau Bull.* 41, 1913.

Cox, H. J.: "Frost and temperature conditions in the cranberry marshes of Wisconsin," *U. S. Wea. Bureau Bull. T.,* 1910.

McAdie, A. G.: "Frost," *U. S. Wea. Bureau Bull. L,* 1903, pp. 227-37.

McAdie, A. G.: "Notes on frost," *U. S. Dept. Agriculture, Farmer's Bulletin* 104, ed. 2, 1910.

Monthly Weather Review, Frost papers by various authors, vol. 42, Oct. 1914, pp. 562-592.

Scientific American Supplement, "Frost protection in fruit orchards," vol. 72 (1911) pp. 281-282.

NOTE: Frost damage is due to the low temperature and not to the formation of frost; "black frost" or "dry freeze" is as dangerous as hoar frost. The actual damage depends upon the degree and duration of the cold, and upon the condition of the plant at the time. Aside from the "general freezes," when large masses of air are involved, freezing temperatures are reached only on clear quiet nights. The drainage of the cold air to lower levels results in heavier frosts in the valley bottoms and similar places. Frost must be regarded as a local phenomenon, although the general conditions must be favorable for freezing temperatures. Of course, the whole of a very wide area may have frost at the same time.

Protection against frost damage depends upon

I. Prevention of freezing temperatures by adding heat to the air
   1. Fires
   2. Steam pipes
   3. Hot water in ditches
   4. Electric heat (not yet practised).

II. Prevention of freezing temperatures by checking terrestrial radiation
   1. Covers of lath, cloth, paper, or glass
   2. Clouds of smoke, steam, or fine mist

3. Increased humidity from
   a) Evaporation of water by heat
   b) Irrigation with hot or cold water
   c) Sprays of water or steam.

III. Prevention of freezing temperatures by increasing the specific heat of the surface of the earth
   1. Flooding
   2. Irrigation.

IV. Prevention of freezing temperatures by mixing the air
   1. Wind breaks
   2. Mechanical movement (not yet practiced).

V. Protection of frosted plants from too rapid warming by the sun
   1. Shading
      a) Covers or roofs of lath, cloth, or paper
      b) Clouds of smoke or steam
   2. Spraying with cold water just before sunrise.

Effective frost fighting depends upon

I. Knowledge of
   1. Nature of frost and frost damage
   2. Times and places of frost occurrence
   3. Methods of protection.

II. Preparation by
   1. Receipt of frost forecasts
   2. Having materials for fighting in readiness before the beginning of the season of possible frost
   3. Detailed plan of action.

III. Co-operation
   1. With the U. S. Weather Bureau and other organizations
   2. Among the growers of the region.

The Use of U. S. Geological Survey Maps

The intrinsic worth of the Geological Survey's topographic atlas sheets as a means of education for school children is but little appreciated. Engineers have long realized the excellence of the Survey maps, automobilists and hikers have become educated to them, but the stimulus they afford to school children not only in the study of geography but of history and American literature is yet to be recognized.

A careful study of the Survey's atlas sheet of Boston and vicinity, for example, will convince the progressive teacher of the unlimited possibilities in this map. The map of Boston and vicinity is double the size of the standard sheets and sells for 20 cents a copy. Orders should be addressed to the Director, U. S. Geological Survey, Washington, D. C., and accompanied by remittance.

CHILE

CHILE is a land of possibilities. Her principle geographical disadvantages lie in her shape and situation. The former is unfavorable to unified development, due to the separation of the country 3000 miles long into such unlike regions. It is a difficult matter to keep them united in sentiment and interests. To a certain extent, however, the past isolation of Chile is being overcome; the trans-Andean railroad from Valparaiso to Buenos Aires gives connection with the foremost South American seaport, one which has direct communication with Europe. It is possible to make the trip, a distance of eight hundred eighty miles, in forty-eight hours, with an all-night stop at Los Andes. The Panama Canal is another offset to the disadvantage of situation.

Comparison with Japan

Japan and Chile are somewhat similar in situation and shape. Both are long, narrow, and mountainous; both are far away from leading commercial countries. Japan, by actual measurement, is farther away from United States and European countries than is Chile, yet Japan is recognized as one of the leading nations. Japan is only one-half as large, yet it supports about seventeen times as many people. The area of arable land in Chile is greater. It is probable that Chile, with intensive farming, could support more people than Japan. But there is a difference in the people. The Chileans have much Indian blood in their veins and that may account for their failure really to make conspicuous progress as a nation.

Condition of the People

The system of great landed estates in Chile is a serious drawback. The poorer class have little chance to own land as long as the present system exists. The strength of a nation is measured in terms of a strong, land-owning middle class. It seems necessary for Chile to provide that the middle class may more generally own property, especially farm land. The system of suffrage is a weakness since only twenty-five per cent vote. Those who are not encouraged to vote take little interest in governmental affairs.

The Chileans recognize the need of trained men and women and have provided schools. But public sentiment is not in favor of all classes attending school, so no compulsory law is in force.

Nitrate Fields

The rich nitrate deposits are the cause of lavish expenditures. In 20 years Chile has received $425,000,000 from export duties on nitrate. This is not used to rid a poor country of its national debt but for building showy structures in their principal cities. There is a possibility of exhausting the supply of nitrate. When such a time comes the Chileans will be wholly unprepared, for they have no system of land tax. Should such a tax be gradually

imposed, while some of the revenue money is conserved, it would save Chile a great calamity.

Advantages of Chile

Chile's advantages are greater than her disadvantages. Soil, much of which is naturally fertile; minerals—nitrate, coal, iron, and copper; dense forests in the south, and abundant water power, make her rich in natural resources. With these advantages there is no natural obstacle to Chile's becoming a manufacturing country. The fact that Chile contains most of the coal in South America ought to lead to a greater development of this resource.

Chile ranks third among the countries of South America. The people call themselves the Yankees of South America. Chile is younger than the United States, but has the advantage of being young in this age of the world.

Granted a change in land ownership and forty years more of development we may witness a marvelous change.

Emily A. Budd.

THE GEOGRAPHY TEACHER'S RESOLUTIONS

AT the opening of the new school year, I hereby record my resolution,—

1. To attempt to teach a smaller number of facts than I did last year, to select those facts more thoughtfully, and to impress them more lastingly.

2. To make constant use of the wall map.

3. To make the study of the map and of the map questions in the book a liberal portion of each week's work.

4. To have my pupils make free-hand sketch maps, rapidly drawn, as a means of impressing mental map pictures.

5. To try to impress a limited number of significant facts about each country, so that my pupils shall appreciate what each country really represents in the family of nations,—come to feel that each country has its own individuality, stands for certain ideals and contributes certain things to the world's progress.

6. To have my pupils clip geographical items of importance from the papers or magazines and tell why the items are important.

7. To cultivate in my pupils the habit of using the atlas, the encyclopedia, the annual statistical abstract of the United States, the Census reports, and other standard reference books.

8. To use the illustrations which my own city and region supply, as a means of understanding the geography of more distant places.

9. To prepare my own lessons so that I can teach interestingly and confidently.

10. To try to remember that geography is inherently interesting to children, and that they will like it if it is well taught. R. H. W.

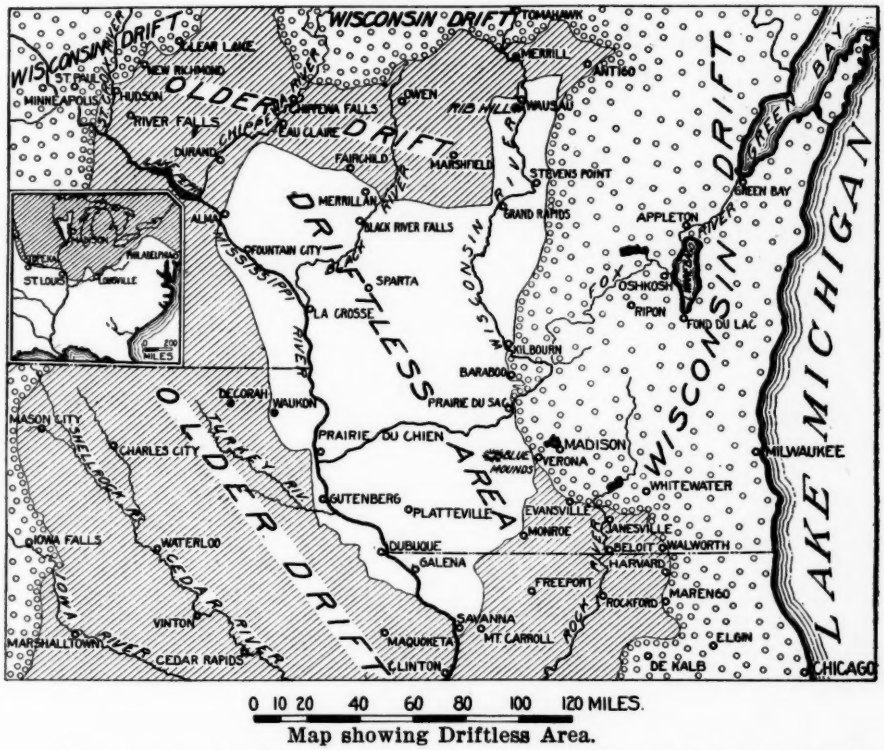
THE DISCOVERY OF THE PAINTED STONE, AN EARLY OBSERVATION OF THE DRIFTLESS AREA

IN southwestern Wisconsin, as is well known, and to a small extent in southeastern Minnesota , northeastern Iowa, and northwestern Illinois, there is a Driftless Area,—that is, a region which has never been covered by ice, although the land on all sides of it was once buried by glaciers similar to those found today in Antarctica and Greenland. The region covers nearly 15,000 square miles. Its dimensions are roughly 210 miles north and south by 120 miles east and west. The observations referred to below were published in W. H. Keating's "Narrative of an Expedition to the Source of St. Peter's River, Lake Winnipeek, Lake of the Woods, etc. etc." performed in the year 1823, Vol. 1, Philadelphia, 1824, pp. 200, 263, 287-288.

Nearly a century ago Professor Keating, a geologist from the University of Pennsylvania, travelled overland from Chicago to Prairie du Chien, and then went up the Mississippi to Minneapolis. In southwestern Wisconsin he noted the absence of the granite boulders, elsewhere known to have been brought by the continental glacier, but which he thought of as erratics of very old, or "primitive," rock, transported during the Flood. He commented upon this change and he did so close to the southern border of the district we now call the Driftless Area. After crossing the Driftless Area he also observed the resumption of the erratics at the first point where one could possibly see them while following Keating's route. This was close to the northwestern boundary of Wisconsin, at Red Rock, below St. Paul, Minnesota. Just after he passed Lake St. Croix, Keating says that they:

"landed, for a few minutes, to examine a stone which is held in high veneration by the Indians; on account of the red pigment with which it is bedawbed, it is generally called the painted stone. They remarked that this was the first bowlder of primitive rock, which they had seen to the west of Rock river. * * * It is a fragment of sienite, which is about four and a half feet in diameter. It is not surprising that the Indians should have viewed this rock with some curiosity, and deemed it wonderful, considering that its characters differ so materially from those of the rocks which are found in the neighbourhood. A man who lives in a country where the highest hills are wholly formed of sandstone and secondary limestone, will necessarily be struck with the peculiar characters of the first specimen of granite that comes under his notice, and it is not to be wondered at, that one who 'sees God in all things,' should have made of such a stone an object of worship. The Indians frequently offer presents to the Great Spirit near this stone; among the offerings of their superstition, the party found the feather of an eagle, two roots of the "Pomme de Prairie," (*psoralea esculenta,* Nuttall), painted with vermilion; a willow branch whose stem was painted red, had been stuck into the ground on one side, etc. The gentlemen broke off a fragment of this idol, to add to the mineralogical collections, taking care, however, not to leave any

chips, the sight of which would wound the feelings of the devotee, by convincing him that the object of his worship had been violated."



Map showing Driftless Area.

Thus we see that Keating, who was almost the first geologist to visit the Driftless Area, clearly recognized its phenomena at both borders. His only geological predecessor, Schoolcraft, also identified its boundary, but at a later time and in another place, for Schoolcraft mentions nothing of this sort in his first journey, three years before Keating's. Major Pike likewise landed at the Painted Stone in 1805, but he did not know its significance. Major Long made observations in 1817 that would have enabled him to recognize the Driftless Area phenomena if he had been a geologist. Other early observations of the Driftless Area phenomena were made independently in Colhoun in 1823, Schoolcraft in 1831, Owen in 1839, Hodge in 1841, Lapham in 1844, Norwood in 1847, Daniels in 1854, Percival in 1855, Whitney in 1862, Strong in 1874, McGee in 1878 and many others. It was correctly explained by Irving, Winchell, and Chamberlin in 1877 and 1878. The most complete description of the Driftless Area was published by Chamberlin and Salisbury in 1885.

In 1823 Professor Keating even collected a specimen from the Painted Stone—the first erratic he saw after leaving the Driftless Area. But he was not the real pioneer, for the naked aborigines had painted the stone red, and worshipped it!

LAWRENCE MARTIN.

CURRENT GEOGRAPHICAL NOTES

Geography with the Allies in the Present War?

Count Reventlow points out that the alliance against Germany now comprises Russia, England, France, Belgium, Servia, Italy, Japan, and Geography; and that only to the last named ally can be attributed such successes as have been scored against Germany on the sea:

How must it be with British reliance (says Count Reventlow) when the First Lord of the Admiralty boasts of having driven German trade off the seas? That is less due to the accomplishments of the British fleets than to the geographical configuration of the North Sea. The British Isles dominate the exits, making barriers for trade remarkably easy.

It is plain that if the North Sea were as big as the Pacific, or Germany were situated off the coast of Tasmania, things would be different. For the nation of *Realpolitik,* for a people that scorns sentimentalities when it comes to the business of war, and insists on hard facts, it is rather odd to complain against the North Sea being where it is. It is the German way of using science to make a special case. We have been told that the war was a biological necessity for Germany, because she has seventy million people, and a geographical necessity because Germany lies where it does. The invasion of Belgium was also justified by geography. Germany's ultimate triumph is a physiological necessity, because of her superior nervous organization, and a psychological necessity because of the will to conquer. But England must be denied the consolations of science. However, the laws of logic must not be too strictly enforced amidst the clash of arms. So *Gott strafe* the Glacial Period, or whatever it was that made the North Sea.—[*The Nation,* Aug. 12, 1915.]

Map of the United States for 1 Cent

Teachers who are not familiar with the many and various maps published by the United States Geological Survey will be interested to learn of a small map of the United States which is sold by that bureau at the nominal price of 1 cent. This map shows rivers, lakes, State boundaries, State capitals, and principal cities, but not the less important features, whose numerous names and symbols tend to create obscurity and confusion. It measures about 8½ by 12 inches.

The Survey publishes also maps of the United States on larger scales, one on a scale of about 190 miles to 1 inch, for 5 cents retail, and one on a scale of about 110 miles to 1 inch, with contours to show relief, or without contours, for 15 cents retail.

A relief map of the United States measuring 18 by 28 inches, on a scale of 110 miles to the inch, is sold for 15 cents. This map shows the rivers, principal cities, and State boundaries, and is shaded in colors to show the heights above sea level of all parts of the country.

Address the Director, U. S. Geological Survey, Washington, D. C., and accompanied by remittance, in cash or postal money order.

The Ineffective Blockade of the British Isles

It is now almost exactly six months since the German Admiralty proclaimed its submarine "blockade" of Great Britain, and announced that "every hostile merchantman . . . will be destroyed." What are the net results of military value? One great aim of the campaign was to cut off supplies from England—especially foodstuffs. Without imported food, England would starve. Thus the English threat of starving out Germany was to be retorted. Yet during the first five months of submarine activity in British waters, the official figures of imports show that 100,000 tons *more* of foodstuffs were received in England than during the corresponding five months of 1914. This does not look as if the German plan of reducing England by starvation were succeeding any better than the British scheme to leave Germany with only half enough food to live on. As for the actual destruction of British shipping—virtually all of it insured, by the way, so that the owners lose nothing—it is variously estimated, but is surely less than one per cent. of the vessels actually coming and going through the war zone. Lloyd's Register has recently issued the quarterly returns of new ships—leaving out men-of-war—under construction in British yards at the end of June. The total of 1,500,000 tons. The tonnage of the ships sunk by the Germans is a little over 200,000. Thus the British mercantile marine is not exactly disappearing. In fact, despite the submarines, the year has been one of large profits for shipowners.—[*The Nation,* Aug. 12, 1915.]

A Traveler's Guide to the Pacific Coast

Immediately after the publication of its Northern Pacific Guidebook (Bulletin 611) the United States Geological Survey announced the issue of a guidebook covering the Shasta Route and Coast Line, embracing the territory from Seattle to Los Angeles. Its title is "Guidebook of the Western United States, Part D, The Shasta Route and Coast Line" (Bulletin 614), and it comprises 142 pages, 19 topographic maps, 33 reproduced photographs, and 15 text figures. This book is written in the same popular vein as the other Survey guidebooks, and as the country which it covers presents many notable scenic and geologic features and is pregnant with interesting history and tradition, the volume promises to be one of the most successful of the series. Turning the pages of this book, through which are liberally interspersed topographic maps and illustrations, the traveler finds interpreted for him in simple language, many things of interest.

To travel through our great West in company with a geologist gifted with the power of expression and explanation is a rare privilege. The pages of the Geological Survey's guidebooks offer an even more unusual privilege, for the information they contain is the product of many minds and comprises a vast amount of geologic, botanical, and general information, given in a simple and interesting way. The guidebook maps show the topographic features along the route.

The book is for sale by the Superintendent of Documents, Washington, D. C., at $1 a copy.

Panama Ships and Cargoes

A year of the Panama Canal has now passed into history. The Canal was opened to commerce on August 15, 1914, when the stalwart *Ancon,* a Panama Railroad liner, that as a transport from New York had borne a notable part in the construction of the waterway, went through from Cristobal to Balboa. There followed the next day the great *Arizonan* of the American-Hawaiian Steamship Company, and the first foreign craft on a foreign voyage came on August 22, the *Daldorch,* of Glasgow, with wheat from Puget Sound for Ireland. Sudden war had broken out; ships of belligerent flags were flying for shelter, and the best of them were being commandeered by their governments.

Twelve of the fourteen vessels that traversed the Canal during the first week were Americans. In the Review of Reviews for May, 1913, beginning an article on "American Ships at Panama," the present writer had asked: "Is the American flag to be a stranger in the Panama Canal when it is completed? Will all maritime nations be prepared and ready then to make use of the Canal except the nation whose money and energy have built it?" The year since August, 1914, has brought its clear and gratifying answer. The Stars and Stripes have led all other national colors; the merchant fleet that has made best use of the new waterway is the fleet of the United States.

All told, the net canal tonnage, on which tolls are based, of vessels traversing the Panama Canal for the twelve months ending July 31, 1915, was 4,404,364, of which by far the greatest single element was the wholly American coast-to-coast tonnage of 1,416,294. In addition to this coast fleet other American cargo vessels made a certain number of foreign voyages, particularly in the trade to and from the west coast of South America, where they were employed because of war-effects upon European tonnage. Throughout the Government fiscal year ending June 30, 1915, the tolls paid at Panama by the ships of all nationalities in all trades amounted to $4,343,383, while the actual cost of operation for the same period was $4,112,550. Thus, superficially, the Canal was self-sustaining, but it must be remembered that in this statement no allowance is made for interest on the capital invested, depreciation, etc. For the time being, and until normal conditions are established, the Canal must be regarded as a great, permanent public work, the value of which cannot be measured by the commercial standard of dividends.

Ships from Australasia, the nearer edge of the Far East, and the west coast of South America for Europe and the Atlantic Coast of the United States, and ships outward bound from Europe and the Atlantic Coast on the reverse routes have constituted the chief foreign tonnage passing through the Canal. These have been "tramp" vessels or the pioneers of small freight lines as a rule; few passenger and mail liners were among them.

Crude materials and foodstuffs have made up a large part of the cargoes eastbound and westbound,—sugar, coal, copper, flour, iron-ore, lumber, oil, nitrates, wines, and grain. But manufactures of iron and steel machinery

and railroad materials conspicuously figured in both coastwise and overseas commerce. As to "general cargo," including much highly finished and valuable merchandise, it is significant that out of 100,027 tons carried through the canal from the Atlantic to the Pacific, in June last, 42,929 tons were in the American coastwise trade, and out of 38,614 tons from the Pacific to the Atlantic 33,576 tons were in the coastwise trade, whose ships made up more than one-third of the entire traffic of the new waterway.

Panama of Chief Advantage to America

The American flag in the coast-to-coast trade will continue to float securely and proudly at Panama so long as the historic coastwise law remains unchanged. A year ago, in August, 1914, an effort to uproot it was overwhelmingly defeated in Washington. Those in this country and abroad who urged the repeal insisted that when the Canal was opened not enough American ships would be forthcoming, even for the coastwise commerce, and that foreign ships would have to be employed. That this was an error is now demonstrated by experience. American ships in coast-to-coast trade have proved to be numerous and adequate. Freight rates from coast to coast have been substantially reduced; a great new commerce is developing.

Throughout this abnormal year of war, American shipowners of the Atlantic-Pacific fleet could have enriched themselves by abandoning their proper services and chartering all their ships at unexampled rates to carry foodstuffs and munitions to Europe. But they have not done this; they have occasionally employed thus only a few spare vessels; every one of the chief services has been steadily maintained. These shipowners have honorably recognized that their first duty was to their own flag and to their own countrymen. —From "The First Year at Panama," by Winthrop L. Marvin, in the *American Review of Reviews* for September.

When the Gulf of Mexico Reached Cairo

In the course of its investigations of the geology of the country, the United States Geological Survey has found that the ocean formerly covered much of what is now the Atlantic Coastal Plain, while the Gulf of Mexico spread widely over the central Southern States, probably reaching as far north as Cairo, Ill. The Ohio was then a longer and older river than the Mississippi. Some of the sediments of this age, now hardened into rocks, were deposited in a shallow sea, some about the mouths of rivers, and some perhaps in the flood plains of the rivers themselves. All these different types of sediments, as found in the eastern Gulf region, are described in the United States Geological Survey's Professional Paper 81, which may be obtained without cost by applying to the Director of the United States Geological Survey, Washington, D. C.

NEWS NOTES

Dr. Lucy Wilson, head of the Department of Geography of the Girls' Normal School, Philadelphia, was engaged during the past summer in excavation work in New Mexico. As the result of her work she has brought back to the Philadelphia Museum nearly a half-ton of pottery, primitive stone objects, skeletons, etc. Dr. Wilson, with the aid of Indians, excavated 36 rooms in the ruins of Otowi in the Jemez National Forest, New Mexico, and unearthed a great quantity of interesting material.

Prof. O. D. von Engeln of Cornell University, has contributed an excellent article on the "Geography of the Ithaca (N. Y.) Region," to the Centennial number of the Ithaca Journal, recently issued. The article covers two and a half newspaper pages and is illustrated with a map and two block diagrams.

A. J. Nystrom & Co., Geographical publishers, Chicago, have just issued catalog No. 16, nearly 200 pages. It includes models, globes, black-board outline maps, political maps, commercial maps, physical maps, historical maps, charts, atlases, geographical pictures and much other material. Geography teachers should have a copy on file.

Prof. Jas. F. Chamberlain of the Los Angeles Normal School, represented the National Council of Geography Teachers at the Oakland meeting of the National Education Association. He has sent in the following report of the meeting:

Geography at the Oakland Meeting of the N. E. A.

During the recent sessions of the National Education Association, held in Oakland, California, there occurred an interesting and profitable conference of teachers of geography, principals and superintendents. In a general way the conference represented the National Council of Geography Teachers, although the national officers assumed no responsibility for the meetings. There was a forenoon and an afternoon session, and both were well attended.

"Geography in Colleges and Universities" was presented by R. S. Holway of the University of California and W. H. Snyder, principal of the Hollywood high school, Los Angeles; Mrs. Mary W. George of the San Jose State Normal School and James F. Chamberlain of the Los Angeles State Normal School, dealt with "Geography in Normal Schools." The forenoon session was devoted to these topics. In the afternoon "Geography in High Schools" was discussed by Roy E. Dickerson of the Mission High School, San Francisco, and George C. Bush, principal of the South Pasadena High School. The last topic to be presented, "Geography in Elementary Schools," was handled by Harold W. Fairbanks of Berkeley, California, and Mrs. M. Alice Hanson, of Pasadena, California.

There was an animated and profitable general discussion which was participated in by a large number of persons. Much interest was shown in the Council of Geography Teachers, and many teachers joined the organization.